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THE NEOTROPICAL *STELIS*-LIKE CLEPTOPARASITIC BEES (HYMENOPTERA: MEGACHILIDAE)

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Abstract.—The South American cleptoparasitic *Stelis*-like bees are not closely related to *Stelis*; they were derived independently from nest-making anthidiine bees similar to *Hypanthidioides*. They are here placed in the genus *Hoplostelis*, which has two subgenera. One, *Austrostelis* n. subg. (type species: *Stelis aliena* Cockerell), contains small, rather slender forms resembling *Hypanthidioides* and its relatives. They probably parasitize such Anthidiini. The other, *Hoplostelis* s. str. (= *Odontostelis*), contains larger, more robust species that parasitize *Euglossa*.

Key Words: Hymenoptera, Megachilidae, Anthidiini, *Hoplostelis*, cleptoparasites, Neotropics

Cleptoparasitic bees, dependent on provisions in nest cells of host bees for their larval food, are known in various bee families. Aside from the large cleptoparasitic lineage Nomadinae in the Apidae (sense of Michener 1944, 1954, Roig-Alsina and Michener 1993), most parasitic bees are dependent upon hosts related to themselves. Thus most species of *Coelioxys* Latreille are parasitic on the related genus *Megachile* Latreille and *Sphecodes* Latreille on related Halictidae. The present paper concerns a recently recognized Neotropical cleptoparasitic lineage that is usually incorrectly attributed to *Stelis* Panzer. Like *Stelis*, it is in the megachilid tribe Anthidiini.

In the tribe Anthidiini there exist various cleptoparasitic taxa; because of the lack of behavioral data some of them are recognized as such only because females lack a pollen-carrying scopa. Most belong to the genus *Stelis*. Its characteristic features include the fore and mid tibiae, each of which has two spines or angles on the outer apical margin (Fig. 1), and the male gonostylus, which has a slender base and an expanded, squarish distal part directed mesad at an angle to the basal part, with a strong angle projecting laterad on the outer margin at the base of the expanded region (see illustrations of Popov 1938 and Mitchell 1962). The closest nonparasitic relative of *Stelis* is not certain. Pasteels (1968, 1969) considered it to be *Bathanthidium* Mavromoustakis, a small genus of the eastern palearctic and oriental regions, because of the large and medially divided scutoscutellar fovea and the small median apical comb on S4 of the male, features also found in at least some species of *Stelis*. In the characters of tibiae and male genitalia listed above, *Bathanthidium* does not agree with *Stelis*.

The suggestion has been made that *Protostelis* Friese, a parasite of *Trachusa* Panzer, might be derived from *Trachusa*-like bees. However, *Protostelis* does not have the reflexed male T7 of *Trachusa*, and does have tibial spines and genitalic characters like

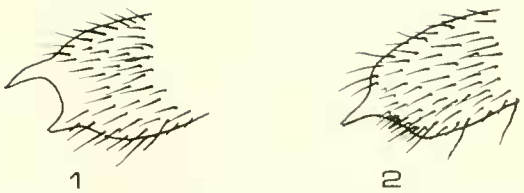
Stelis. *Protostelis* seems to be clearly a member of the *Stelis* lineage, and we regard *Protostelis* as a subgenus of *Stelis*. *Dolichostelis* Parker and Bohart, which Parker and Bohart (1979) considered related to the group now called *Hoplostelis* Dominique, is also a member of the *Stelis* group as shown by the tibial and genitalic characters listed above as well as by other characters.

There exist a few other anthidiine taxa with two apical spines or angles on at least the middle tibia. These include *Euaspis* Gerstaecker (another cleptoparasitic genus), *Plesianthidium* Cameron, *Spinanthidium* Mavromoustakis, most species of *Pachyanthidium* Friese and *Rhodanthidium* Isensee, and certain species of *Eoanthidium* Popov, e.g. *E. turnericum* (Mavromoustakis). None of these seems to be closely related to *Stelis*.

Stelis is a primarily Holarctic genus; there are morphologically unusual probable derivatives in Africa and southeast Asia. The related *Dolichostelis* is largely North American but ranges south to Costa Rica.

As noted by Griswold and Michener (1988), various South American species have been attributed to *Stelis*, and superficially resemble yellow and black species of that genus and especially *Dolichostelis*. This South American group and *Stelis* are, however, independently derived from different nest-making anthidiines. Large South American species that parasitize the apid genus *Euglossa* Latreille long ago received a genus-group name (*Hoplostelis*). The smaller species lack such a name. They are so different from *Hoplostelis* that they might well have been given generic status, but we prefer to show their relationship by considering them to be a subgenus of *Hoplostelis*.

In the following description, the abbreviations T1, T2, S1, etc., represent the first, second, etc., metasomal tergum or sternum. The juxtantennal carina is the longitudinal carina immediately mesad of the antennal base and often partly overlapping it; the terms interantennal or interalveolar carina are not used because they imply a carina extending from one antennal base to the other. The omalus is the angle on which the anterior surface of the mesepisternum meets the lateral surface.



Figs. 1, 2. Outer surface of apex of middle tibia of female, anterior margin uppermost. 1, *Stelis montana* Cresson. 2, *Hoplostelis* (*Austrostelis*) near *iheringi* (Schrottky) from Nova Teutonia, Santa Catarina, Brazil.

Genus *Hoplostelis* Dominique

Hoplostelis s. str. (or its synonym, *Odontostelis* Cockerell) has been recognized as a distinctive form, often at the genus level, for many years. Various other neotropical bees, here placed in the subgenus *Austrostelis* of *Hoplostelis*, have been described in the genus *Stelis* because they are anthidiines, less distinctive than *Hoplostelis* s. str., that lack a scopa in the female and are therefore presumably cleptoparasites. They resemble *Stelis* and some other cleptoparasitic anthidiines not only in overall appearance but in some details. Thus T6 in the female has transverse rugulae as in *Dolichostelis* and *Afrostelis* Cockerell, and a strong preapical carina as in those genera and some subgenera of *Stelis* such as *Protostelis*, *Pseudostelis* Popov, and *Stelidomorpha* Morawitz. *Hoplostelis* s. l. differs from these taxa, however, in having only one apical spine on each front and middle tibia (Fig. 2). Moreover, in *Hoplostelis* the male gonostyli lack the characteristic angulate form found in *Stelis*, and the mandible of the female has four teeth rather than three. *Hoplostelis* is most closely related to the nest-making genus *Hypanthidioides* Moure in a broad sense, including such genus-group taxa as *Anthidulum* Michener, *Ctenanthidium* Urban, *Dichanthidium*

Moure, and *Saranthidium* Moure and Hurd. Among other common characters, both *Hoplostelis* and *Hypanthidiodes* s. l. have strong juxtantennal carinae, lack the preoccipital carina, have an omalar carina on the upper half of the mesepisternum and lateral teeth on S5 and usually S6 of the male. The presence of arolia in both sexes of *Hoplostelis* s. l. suggests *Dichanthidium* and *Ctenanthidium*. The small and simple or weakly bilobed T7 of the male of *Hoplostelis* is more similar to the more deeply bilobed T7 of *Ctenanthidium*, *Dichanthidium*, and *Saranthidium* than to that of other allies of *Hypanthidiodes*. The male does not have a comb on S5 as does *Saranthidium* nor on S3 as does *Ctenanthidium*. Thus *Hoplostelis* is not readily associated with any one taxon of *Hypanthidiodes* s. l.

Key to the Subgenera of *Hoplostelis*

1. T1 with strong transverse carina margining basal declivity; T1 and T2 exceedingly finely and densely punctate middorsally; body somewhat elongate, metasoma cylindrical; mandible with basoventral pit (accentuated part of basal depressed zone) and in female with basodorsal protuberance; mandible of female with third and fourth teeth shifted basad, fourth (uppermost) tooth nearer to base of mandible than to apex, or absent, distal half of mandible only half as wide as base; S6 of male with raised V-shaped ridge apically ..... *Hoplostelis* s. str.
– T1 without transverse carina margining basal declivity, although distinctly angulate; T1 and T2 coarsely to rather finely, but not densely, punctate; body robust, metasoma almost globose; mandible without basoventral pit or basodorsal protuberance; mandible of female unmodified, with intervals between four teeth roughly equal; S6 of male without raised area ..... *Austrostelis*

Austrostelis New Subgenus

Type species.—*Stelis aliena* Cockerell, 1919.

This subgenus contains species of the size (5.5–8.5 mm long), shape, and coloration of *Hypanthidiodes* and its relatives such as *Anthidulum*, *Ctenanthidium*, *Gnathanthidium* Urban,[1] and *Saranthidium*. Major characters are as follows: Mandible of female 4-toothed, apical width approximately equal to basal width, without protuberance; juxtantennal carina strong; clypeus truncate, margin sometimes denticulate; preoccipital carina absent. Pronotal lobe with strong carina; omalus sharp, upper part rather weakly carinate; scutoscutellar suture deeply foveate, floor of the two foveae (sometimes completely fused) smooth, shining, horizontal; scutellum not produced over metanotum, not carinate, a distinct notch between scutellum and axilla as seen from above; propodeum with well-defined large fovea behind spiracle and subhorizontal row of well-defined pits across base, as in *Dolichostelis*. Front and middle tibiae each with one apical spine; female with posterior part of apex of hind tibia with outer margin flared as small, rounded, flat projection; arolia present in both sexes. Metasomal terga and sterna about as coarsely punctate as thorax. T1 with strong line but no carina delimiting basal concavity. T6 of female broadly truncate, rounded laterally, margin of truncation reflexed; S6 strongly curved upward at apex and slightly exceeding T6. T7 of male rather small, rounded or weakly bilobed. Sterna of male little modified, S4 and S5 with fringes of long hair, S6 with surface hairy, without apical raised area, S5 and S6 each with small lateral tooth.

The flat projection at the apex of the hind tibia of the female is not found in *Hoplostelis* s. str. or related genera and is probably a derived character for *Austrostelis*, although most of its characters are plesiomorphic relative to *Hoplostelis* s. str.

Austrostelis ranges from Buenos Aires and La Rioja provinces, Argentina, and Bolivia north through Brazil to western Colombia

[1] This is the South American *Gnathanthidium* Urban (1992), not the African *Gnathanthidium* Pasteels (1969). Urban will propose a new name for the junior homonym.

(Valle Province) and Mexico (San Luis Potosí). All the named species known to us are South American. Eight species were listed by Griswold and Michener (1988), who recognized the group but did not name it. The species are *Hoplostelis aliena* (Cockerell 1919), *argentina* (Friese 1925), *bonaventura* (Friese 1925), *flava* (Friese 1925), *iheringi* (Schrottky 1910), *iheringi* (Friese 1925, perhaps a synonym as well as homonym of *iheringi* Schrottky), *nuda* (Schrottky 1909), *zebrata* (Schrottky 1905).

Hosts are unknown but cannot all be euglossine bees, the only known hosts for *Hoplostelis* s. str., since *Austrostelis* occurs far outside the range of Euglossini, especially in xeric areas of Argentina. It is very probable that *Austrostelis* parasitizes related Anthidiini. A long series of *Hoplostelis* (*Austrostelis*) near *iheringi* (Schrottky) from Nova Teutonia, Santa Catarina, Brazil was collected by Fritz Plaumann apparently in association with similar-looking *Gnathanthidium sakagamii* Urban and species of *Saranthidium* and *Anthidulum*, all members of the *Hypanthidiodes* s. l. group.

Subgenus *Hoplostelis* Dominique s. str.

Hoplostelis Dominique, 1898: 60. No valid included species. Type species: *Stelis abnormis* Friese, 1925 = *Anthidium bivittatum* Cresson, 1878, by inclusion and designation of Griswold and Michener, 1988: 36.

Odontostelis Cockerell, 1931: 542. Type species: *Stelis abnormis* Friese, 1925 = *Anthidium bivittatum* Cresson, 1878, by original designation.

This subgenus includes relatively large (8–11 mm long), robust species having the special features indicated in the key as well as fine punctation of the metasoma compared to the subgenus *Austrostelis*. Unlike *Austrostelis*, T1 and T2 are usually black; the yellow of the remaining, smaller terga contrasts sharply with the black metasomal base.

Hoplostelis s. str. occurs from Bolivia and Santa Catarina, Brazil, north through the tropics as far as Jalisco, Mexico. There are two or three species. So far as known they parasitize euglossine bees (Bennett 1966), a most unusual host for a parasitic megachilid.

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